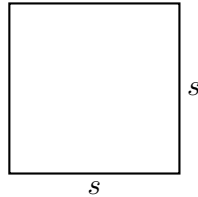


## 2D GEOMETRY FORMULAS

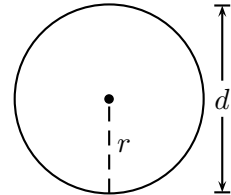
### SQUARE

$s$  = side  
 Area:  $A = s^2$   
 Perimeter:  $P = 4s$



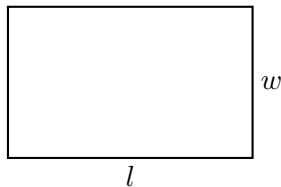
### CIRCLE

$r$  = radius,  $d$  = diameter  
 Diameter:  $d = 2r$   
 Area:  $A = \pi r^2$   
 Circumference:  $C = 2\pi r = \pi d$



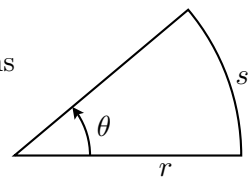
### RECTANGLE

$l$  = length,  $w$  = width  
 Area:  $A = lw$   
 Perimeter:  $P = 2l + 2w$



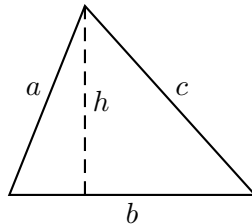
### SECTOR OF CIRCLE

$r$  = radius,  $\theta$  = angle in radians  
 Area:  $A = \frac{1}{2}\theta r^2$   
 Arc Length:  $s = \theta r$



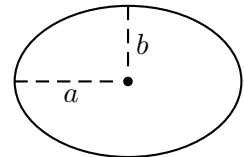
### TRIANGLE

$b$  = base,  $h$  = height  
 Area:  $A = \frac{1}{2}bh$   
 Perimeter:  $P = a + b + c$



### ELLIPSE

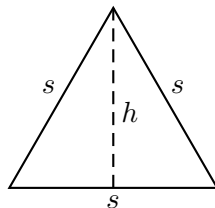
$a$  = semimajor axis  
 $b$  = semiminor axis  
 Area:  $A = \pi ab$



Circumference:  
 $C \approx \pi \left( 3(a + b) - \sqrt{(a + 3b)(b + 3a)} \right)$

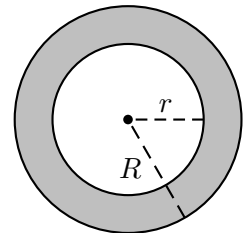
### EQUILATERAL TRIANGLE

$s$  = side  
 Height:  $h = \frac{\sqrt{3}}{2}s$   
 Area:  $A = \frac{\sqrt{3}}{4}s^2$



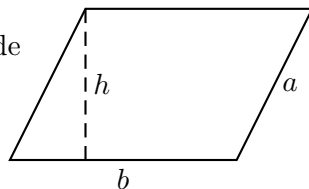
### ANNULUS

$r$  = inner radius,  
 $R$  = outer radius  
 Average Radius:  $\rho = \frac{1}{2}(r + R)$   
 Width:  $w = R - r$   
 Area:  $A = \pi(R^2 - r^2)$   
 or  $A = 2\pi\rho w$



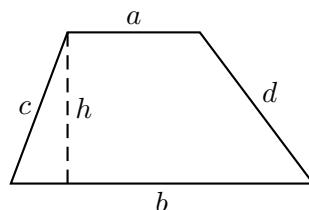
### PARALLELOGRAM

$b$  = base,  $h$  = height,  $a$  = side  
 Area:  $A = bh$   
 Perimeter:  $P = 2a + 2b$



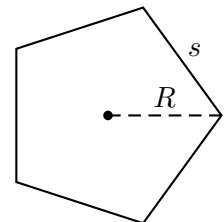
### TRAPEZOID

$a, b$  = bases;  $h$  = height;  
 $c, d$  = sides  
 Area:  $A = \frac{1}{2}(a + b)h$   
 Perimeter:  
 $P = a + b + c + d$



### REGULAR POLYGON

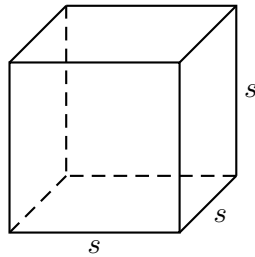
$s$  = side length,  
 $n$  = number of sides  
 Circumradius:  $R = \frac{1}{2}s \csc\left(\frac{\pi}{n}\right)$   
 Area:  $A = \frac{1}{4}ns^2 \cot\left(\frac{\pi}{n}\right)$   
 or  $A = \frac{1}{2}nR^2 \sin\left(\frac{2\pi}{n}\right)$



## 3D GEOMETRY FORMULAS

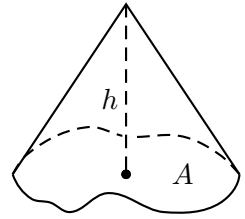
### CUBE

$s$  = side  
 Volume:  $V = s^3$   
 Surface Area:  $S = 6s^2$



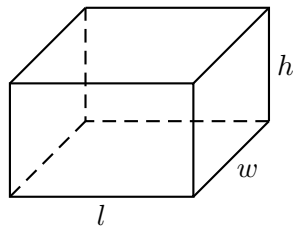
### GENERAL CONE OR PYRAMID

$A$  = area of base,  $h$  = height  
 Volume:  $V = \frac{1}{3}Ah$



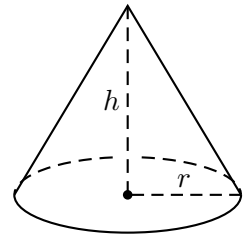
### RECTANGULAR SOLID

$l$  = length,  $w$  = width,  
 $h$  = height  
 Volume:  $V = lwh$   
 Surface Area:  $S = 2lw + 2lh + 2wh$



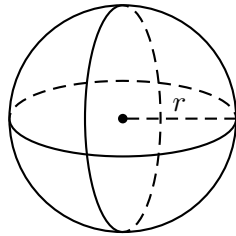
### RIGHT CIRCULAR CONE

$r$  = radius,  $h$  = height  
 Volume:  $V = \frac{1}{3}\pi r^2 h$   
 Surface Area:  $S = \pi r\sqrt{r^2 + h^2} + \pi r^2$



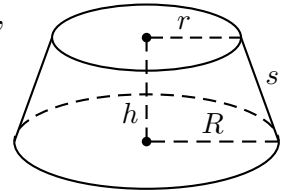
### SPHERE

$r$  = radius  
 Volume:  $V = \frac{4}{3}\pi r^3$   
 Surface Area:  $S = 4\pi r^2$



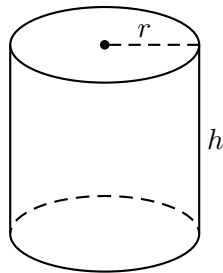
### FRUSTUM OF A CONE

$r$  = top radius,  $R$  = base radius,  
 $h$  = height,  $s$  = slant height  
 Volume:  $V = \frac{\pi}{3}(r^2 + rR + R^2)h$   
 Surface Area:  $S = \pi s(R + r) + \pi r^2 + \pi R^2$



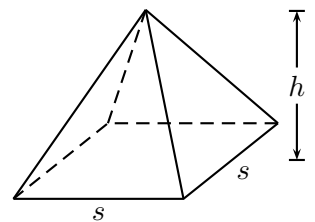
### RIGHT CIRCULAR CYLINDER

$r$  = radius,  $h$  = height  
 Volume:  $V = \pi r^2 h$   
 Surface Area:  $S = 2\pi r h + 2\pi r^2$



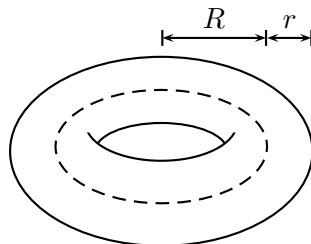
### SQUARE PYRAMID

$s$  = side,  $h$  = height  
 Volume:  $V = \frac{1}{3}s^2 h$   
 Surface Area:  $S = s(s + \sqrt{s^2 + 4h^2})$



### TORUS

$r$  = tube radius,  
 $R$  = torus radius  
 Volume:  $V = 2\pi^2 r^2 R$   
 Surface Area:  $S = 4\pi^2 r R$



### REGULAR TETRAHEDRON

$s$  = side  
 Volume:  $V = \frac{1}{12}\sqrt{2}s^3$   
 Surface Area:  $S = \sqrt{3}s^2$

